

PC Review Sheet  
for Exam 1 Q3  
Key

$$1) (a) \quad \frac{x}{x-2} - \frac{7}{x+3} = \frac{10}{x^2+x-6}$$

$(x+3)(x-2)$        $(x+3)(x-2)$        $(x+3)(x-2)$

$$x^2 + 3x - 8x + 16 = 10$$

$$x^2 - 5x + 6 = 0$$

$$(x-3)(x-2) = 0$$

$$\boxed{x=3} \quad x=2$$

reject

$$(b) \quad \frac{9}{x} + \frac{9}{x-2} = 12$$

$x(x-2)$        $x(x-2)$        $x(x-2)$

$$9x - 18 + 9x = 12x^2 - 24x$$

$$18x - 18 = 12x^2 - 24x$$

$$0 = 12x^2 - 42x + 18$$

$$0 = 6(2x^2 - 7x + 3)$$

$$0 = 6(2x^2 - 6x - x + 3)$$

$$0 = 6(2x(x-3) - 1(x-3))$$

$$0 = 6(2x-1)(x-3)$$

$$\boxed{x = \frac{1}{2} \quad x = 3}$$

$$(c) \quad \frac{4}{x+1} = \frac{5}{2x-2} + \frac{3x}{4}$$

$4(x-1)$        $4(x-1)$        $4(x-1)$

$$16 = 10 + 3x^2 - 3x$$

$$0 = 3x^2 - 3x - 6$$

$$0 = 3(x^2 - x - 2)$$

$$0 = 3(x-2)(x+1)$$

$$0 = 3(x-2)(x+1)$$

$$\boxed{x = 2 \quad x = -1}$$

(2)

$$(d) \frac{1}{2a} - \frac{9}{a^2+6a} = \frac{2-a}{2a+12}$$

$$a+6 - 18 = 2a - a^2$$

$$a^2 - a - 12 = 0$$

$$(a-4)(a+3) = 0$$

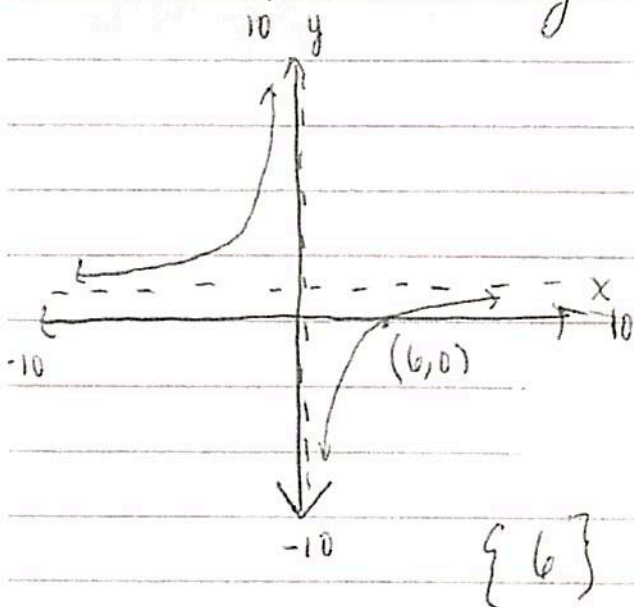
$$a=4 \quad | \quad a=-3$$

$$(2) (a) \frac{x-2}{x} = \frac{x+2}{2x}$$

$$\frac{x-2}{x} - \frac{x+2}{2x} = 0$$

possible vertical asymptotes:  $x=0$

end behavior:  $y = 1 - \frac{1}{2} = +\frac{1}{2}$

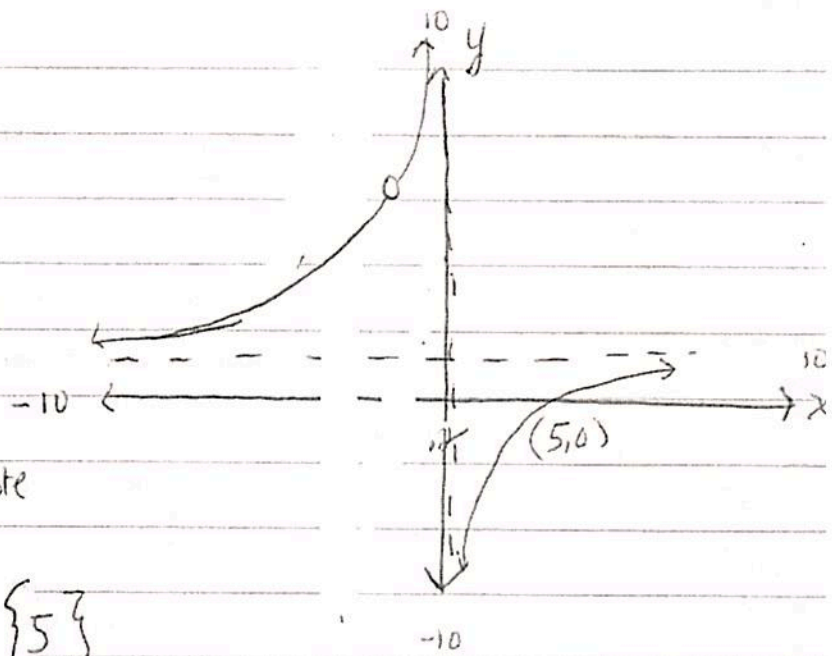


$$(b) \frac{x}{x+2} = \frac{3}{x} + \frac{4}{x^2+2x}$$

$$\frac{x}{x+2} - \frac{3}{x} - \frac{4}{x(x+2)} = 0$$

pVA  $x=0, (-2)$  hole here  
not an asymptote  
EB:  $y = 1 - 0 - 0 = 1$

{5}



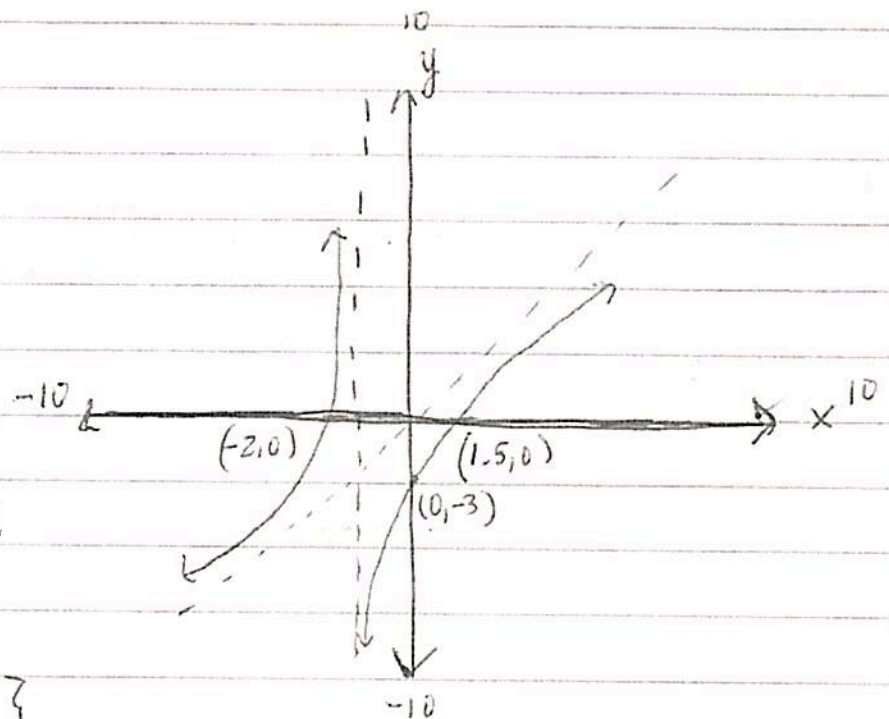
$$(c) \frac{x}{2} = \frac{3}{2x+1}$$

$$\frac{x}{2} - \frac{3}{2x+1} = 0$$

pVA  $x = -\frac{1}{2}$

EB  $y = \frac{1}{2}x - 0 = \frac{1}{2}x$

{-2, 1.5}





③  $\frac{x-1}{4} \geq \frac{8}{x+3}$   
(a)

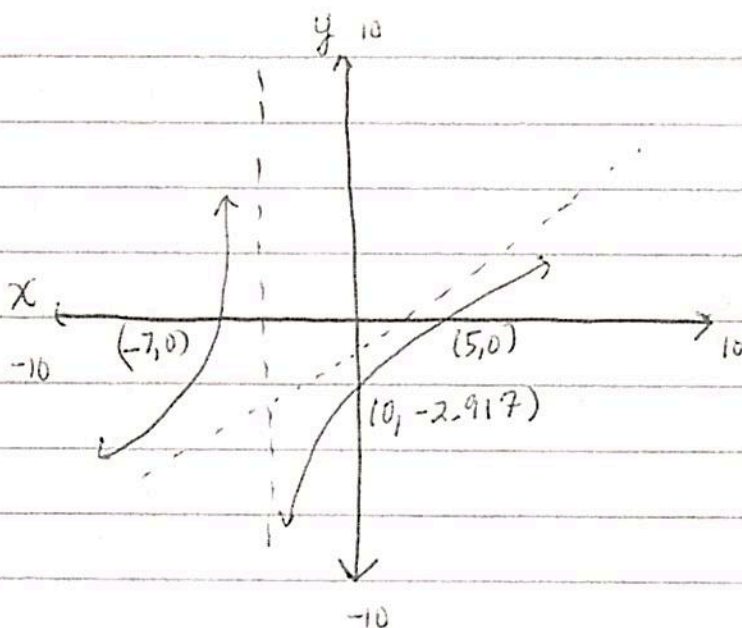
$$\frac{x-1}{4} - \frac{8}{x+3} \geq 0$$

PVA  $x = -3$

EB  $y = \frac{1}{4}x - \frac{1}{4} - 0 = \frac{1}{4}x - \frac{1}{4}$

IN  $[-7, -3) \cup [5, \infty)$

SB  $\{x \mid -7 \leq x < -3 \vee x \geq 5\}$



(b)  $\frac{x-3}{x+2} < 8$

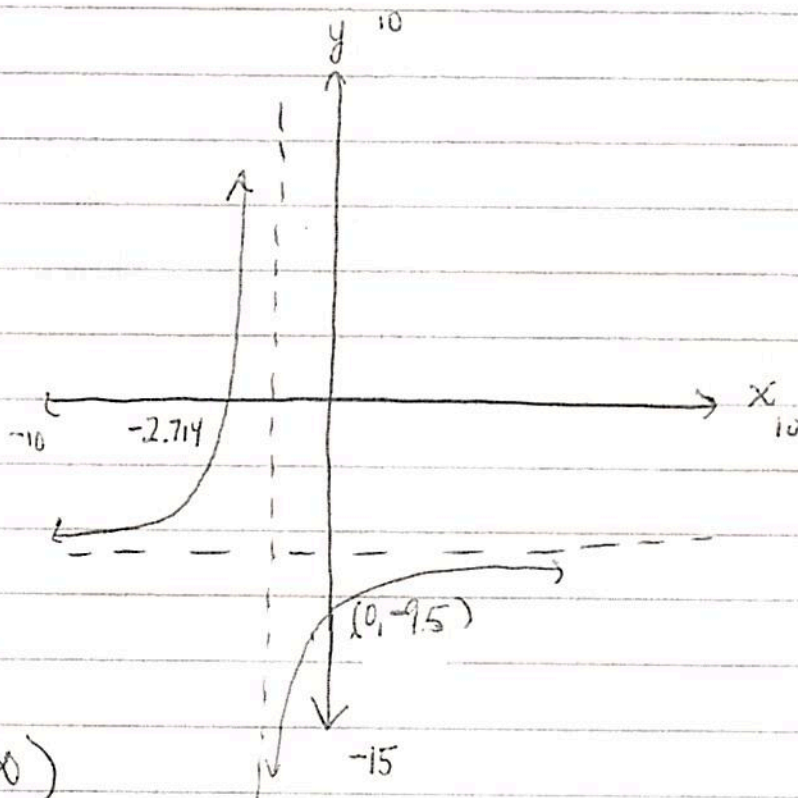
$$\frac{x-3}{x+2} - 8 < 0$$

PVA:  $x = -2$

EB:  $y = 1 - 8 = -7$

IN  $(-\infty, -2.714) \cup (-2, \infty)$

SB  $\{x \mid x < -2.714 \vee x > -2\}$

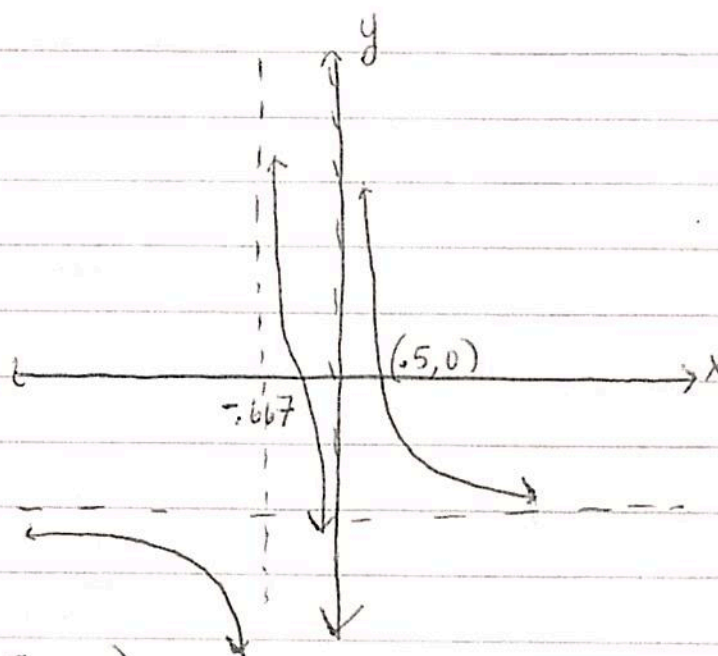


$$(c) \frac{3}{x+1} + \frac{2}{x} < 6$$

$$\frac{3}{x+1} + \frac{2}{x} - 6 < 0$$

$$PVA: x=0, -1$$

$$EB: y = 0 + 0 - 6 = -6$$



$$IN: (-\infty, -1) \cup (-.667, 0) \cup (.5, \infty)$$

$$SB: \{x \mid x < -1 \vee -.667 < x < 0 \vee x > .5\}$$

(4)

Function	Hole(s)	Vertical Asymptote(s)	Horizontal Asymptote	Oblique Asymptote	x-intercept(s)	y-intercept
$y = \frac{x^2 - 4x - 5}{x - 1}$	none	$x = 1$	none	$y = x - 3$	$(5, 0)$ $(-1, 0)$	$(0, 5)$
$y = \frac{(x-5)(x+1)}{x+1}$ $y = x - 5$	$(-1, -6)$	none	none	none	$(5, 0)$	$(0, -5)$
$y = \frac{x^3 - 2x - 5}{x^2 + 1}$	none	none	none	$y = x$	$(2.095, 0)$	$(0, -5)$
$y = \frac{3x}{x^2 - x - 12}$	none	$x = 4, -3$	$y = 0$	none	$(0, 0)$	$(0, 0)$